

Air Rifles—Lethal Weapons

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● Modern air rifles are very powerful and potentially dangerous, yet they are sold without a license because they are considered toys. We report on 16 patients who were shot with air rifles. Nine of these patients were treated in the last 3 years. Seven patients sustained injuries to the chest and upper back. The BB (ball bearing) penetrated the aorta of two patients, one of whom died. One of two patients shot in the abdomen had injuries to the iliac artery and the colon. Three patients were shot in the head and neck, three in the extremities, and one through the penis. Particularly alarming to us is the fact that nine patients had been shot intentionally after minor arguments with other children. The assailants were neighborhood children in seven cases, a friend in five, and a sibling in two.

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INJURIES from air rifles generally are considered to be innocuous. This was probably true in the past, when air rifles were powered by springs and coils; however, modern air rifles are extremely sophisticated and possess a much greater destructive potential. In addition, as our society has become more violent, the incidence of intentional injuries has risen.

MATERIALS AND METHODS

Between July 1978 and December 1994, we treated 16 patients for air rifle injuries. The age range of these 13 boys and 3 girls was 7 to 17 years. Nine were suburban children, and seven were from the inner city. Seven patients were white, four were black, three were hispanic, and two were members of other racial groups.

In 1992, we reported briefly on eight of these patients.¹ The two patients who sustained mediastinal injuries were discussed in details in another report.²

RESULTS

Nine of the 16 patients were treated in the last 3 years. In all but one case the assailant was known, and all were boys. Nine patients had been shot intentionally. A neighborhood child was the culprit in seven cases, one patient had been shot by a friend, and one by an older brother. Nine of the 10 weapons identified were pump action rifles, and the other was powered by a CO₂ cartridge. Table 1 lists the injuries sustained. In five of the seven children with chest and

upper back injuries, the missile was lodged in the muscles. One of these five required elective removal of the BB because of infection. The first of two children with mediastinal penetration was treated nonsurgically after aortography and dynamic computed tomography (CT) scans repeatedly showed no vascular damage. The child died suddenly 5 days after the injury; during postmortem examination, a through-and-through perforation of the proximal intrapericardial ascending aorta was noted, which had resulted in delayed acute pericardial hemorrhage and cardiac arrest.² The second child with mediastinal penetration had exploration through a median sternotomy, even though angiography and dynamic CT scans did not show vascular injury. She had injuries to the thymus and the left upper lobe of the lung as well as an anterior pseudoaneurysm within the pericardial envelope of the ascending thoracic aorta.² Of the two patients with neck injuries, one required exploration to rule out vascular injury. In the second patient, the pellet was imbedded in the sterno-cleido-mastoid muscle. The BB was located in the outer table of the skull of the patient who had been shot in the head. Of the two patients shot in the abdomen, one did well without exploration; the other required repair of the bifurcation of the left iliac artery and a colostomy for a perforated sigmoid colon. The missile had to be removed electively in all three patients shot in the extremities: two complained of persistent pain, and the BB was abutting the median nerve in the third child. One patient was shot through the penis by his older brother. The BB entered the dorsal aspect of the right corpus cavernosum and lodged ventral to the urethra. A retrograde urethrogram and urethroscopy demonstrated an intact urethra. The missile was removed, and the corpora were repaired.

DISCUSSION

Injuries caused by nonpowder firearms generally are considered to be innocuous, unless they involve a particularly vulnerable organ such as the eye³ or the brain.⁴ This belief is widespread even though, from time to time, various investigators have emphasized

Table 1. Injuries Sustained

Chest and upper back	7 (2 intentional)
Abdomen	2 (2 intentional)
Neck	2 (2 intentional)
Head	1
Extremities	3 (2 intentional)
Genital	1 (intentional)

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Table 2. Ballistics: Air Rifles

Spring action	
Daisy III Western Carbine	.177 cal BB, 280 FPS
Daisy Red Rider	.177 cal BB, 280 FPS, 650-shot repeater
Daisy model 1894, spring air	.177 cal BB, 300 FPS
CO ₂ cartridge	
Crosman 262	.177 cal BB, 625 FPS
Crosman 1077	.177 cal BB, 625 FPS, repeat-air semi-automatic, 12-shot rotary clip
Pump action	
Marksman 1710 Plainsman	.177 cal BB, 275 FPS, repeater air rifle
Crosman 788	.177 cal BB, 430 FPS (×10)
Crosman 760	.177 cal BB & Pellet, 570 to 590 FPS
Crosman 66 Powermaster	.177 cal BB & Pellet, 645 to 680 FPS
Daisy 840	.177 cal BB, 320 FPS (×1)
Daisy Powerline 856	.177 cal BB, 630 FPS (×10)
Daisy Powerline 970	.177 cal BB, 655 FPS (×10)
Daisy Powerline 880	.177 cal BB, 685 FPS (×10)

NOTE. Numbers in parentheses denote pump times.

Abbreviations: cal, caliber; FPS, feet per second.

their potential to cause lethal injuries.⁵⁻¹¹ Missiles fired from pump action and CO₂ powered air rifles can achieve velocities of up to 685 feet per second (FPS). This is well above the velocity required for skin penetration (150 to 170 FPS), and even for bone penetration (350 FPS). Table 2 shows the velocities advertised on the packaging of air rifles available in sports, discount, and department stores. It is true that the small mass of a BB does not impart the kinetic

Table 3. Ballistics: Conventional Weapons

Round	Weight Grains	Velocity FPS	Kinetic Energy (Foot – Pounds)
.45	250	860	413
.38	158	870	267
.25	50	820	75

Abbreviation: FPS, feet per second.

energy of a conventional weapon; however, its penetrating capacity is comparable (Table 3). Therefore, it is imperative that patients with air rifle injuries be evaluated and treated very carefully for possible internal injuries.

Homicidal death by an air rifle was first reported 20 years ago.¹² Nine of our 16 patients had been shot intentionally—seven by children in the neighborhood, one by his “friend,” and another by his brother. There were three particularly alarming cases: a sniper shooting from a building across the street, a child shot in the upper back while he was running away from a neighborhood bully, and a child shot because he refused to play with a boy in the neighborhood. In addition, an older brother shot his younger brother through the penis after a “heated discussion.”

We believe that the general population should be made aware that modern-day air rifles are potentially lethal weapons, and physicians who evaluate patients who have sustained air rifle injuries should bear in mind the possibility of serious internal injuries.

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